

1324.68565

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Toshihiro Suzuki et al.
Serial No.: 10/691,461
Conf. No.: 7326
Filed: October 22, 2003
For: LIGHT SOURCE DEVICE AND
DISPLAY HAVING THE SAME
Art Unit: 2629
Examiner: Boddie, William

APPELLANT'S BRIEF ON APPEAL UNDER 37 C.F.R. §41.37

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Date: August 9, 2010

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Mail Stop Appeal Brief - Patents
Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Dear Sir:

This Appeal Brief is in support of Applicant's Notice of Appeal dated May 17, 2010, from the rejection in the Office Action dated February 17, 2010.

APPEAL BRIEF

REAL PARTY IN INTEREST

The real party in interest in this case is Sharp Kabushiki Kaisha, 22-22, Nagaike-cho, Abeno-ku, Osaka-shi, Osaka, Japan 545-8522, the assignee of record.

RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences that will directly affect, be directly affected by, or have a bearing on, the Board's decision in this pending appeal.

STATUS OF CLAIMS

Claims 20-23 are pending and stand rejected. Claims 1-19 and 24-25 have been canceled. The rejection of claims 20-23 is appealed herein.

In summary, the status of the claims is as follows:

- 1-19. (Canceled)
- 20-23. (Rejected and being Appealed)
- 24-25. (Canceled)

STATUS OF AMENDMENTS

In response to the February 17, 2010 Office Action, Amendment I was filed on May 14, 2010, canceling claims 24 and 25, to place the application in better form for appeal. Although Applicants have not received express indication that Amendment I have been entered and acted upon, it is assumed that such is the case since the last Office Action was non-final and the Amendment is entitled to be entered.

SUMMARY OF CLAIMED SUBJECT MATTER

The independent claim under appeal (claim 20) is reproduced below, with bracketed insertions referring to the associated portions of the written description and/or drawings of the above-named application. Dependent claims 21-23 stand or fall with independent claim 20.

20. A liquid crystal display device [Fig. 1] comprising:

a liquid crystal display panel [30 in Figs. 1 and 13];

a driving circuit [80 or 82 in Fig. 1] for supplying a predetermined drive signal to the liquid crystal display panel [p. 9, lns. 5-11]; and

a light source device [41 in Fig. 7] for illuminating the liquid crystal display panel from a back side thereof [p. 9, lns. 23-26; p. 23, lns. 9-15] and having first and second light sources [45a, 45b in Fig. 7] and a light guide plate [42 in Fig. 7],

wherein the light guide plate [42 in Fig. 7] has a planar light exit surface [90 in Fig. 7] provided in the liquid crystal display panel side [30 in Fig. 13], a curved reflecting surface [92 in Fig. 7] that is opposite to the light exit surface [90 in Fig. 7] and that is formed so that a thickness of the light guide plate is smaller at both side end faces and becomes greater in a central part thereof and a light-scattering element formed on the reflecting surface [Fig. 7; p. 23, lns. 15-24];

the first light source [45a, LA' in Fig. 7] is provided in neighborhood ["B" in Fig. 7] of the one side end face [side on which the first light source 45a, LA' is provided] of the light guide plate [42 in Fig. 7]; and

the second source [45b, LB' in Fig. 7] is provided in neighborhood ["A" in Fig. 7] of the other side end face of the light guide plate [42 in Fig. 7]; and

the curved reflecting surface [92 in Fig. 7] is formed so that a light ["a3" in Fig. 7] incident from the one side end face [side on which the first light source 45a, LA' is provided] is reflected totally on the curved reflecting surface [92 in Fig. 7] of a neighborhood ["B"] of the first light source [45a in Fig. 7] and a light incident from the other side end face [side on which the second light source 45a, LB' is provided] is reflected totally on the curved reflecting surface [92 in Fig. 7] of a neighborhood ["A"] of the second light source [45a in Fig. 7; pg. 25, ln. 23 – pg. 26, ln. 9].

GROUND OF REJECTION TO BE REVIEWED ON APPEAL

I. Whether claims 20-23 are unpatentable under 35 U.S.C. §103 over Nakabayashi et al. (US 6,379,017) in view of Kuratomi et al. (US 6,791,566).

ARGUMENT

I. **The Examiner has Failed to Make a *Prima Facie* Case of Obviousness Because Not All the Claimed Features are Disclosed or Suggested in the Cited References, Alone or in Combination.**

- A. The Nakabayashi et al. reference fails to disclose or suggest that the curved reflecting surface is formed so that light is reflected totally on the curved reflecting surface.

As described in claim 20, the curved reflecting surface is formed so that the light incident from the one side end face is reflected totally on the curved reflecting surface of a neighborhood of the first light source (the one side end face), and the light incident from the other side end face is reflected totally on the curved reflecting surface of a neighborhood of the second light source (the other side end face). The claimed curved reflecting surface is shown below in annotated Fig. 7. The light from the light source LA' is reflected on the curved reflecting surface (opposite the light exit surface) in the neighborhood of the light source LA' (the "B" region), and the light from the light source LB' is totally reflected in the neighborhood of the light source LB' (the "A" region).

FIG.7 (annotated)

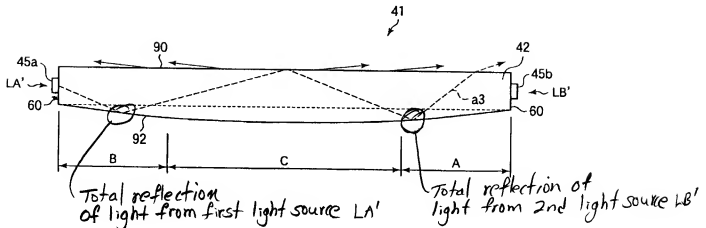


Figure 14 of Nakabayashi et al. is cited in the Office Action as disclosing the feature in which the incident light is reflected totally on the curved reflecting surface. However, neither Fig. 14 nor its corresponding description in the specification disclose or suggest that the incident light is reflected totally on the curved reflecting surface. Figure 14 of Nakabayashi et al. is reproduced below.



Fig. 14 of Nakabayashi

The figure shows that the curved slope 131 is the surface through which the light exits the light guide member 30, and therefore, do not totally reflect light. In fact, the reference teaches that in an arrangement in which a reflecting plate 4 is provided below a

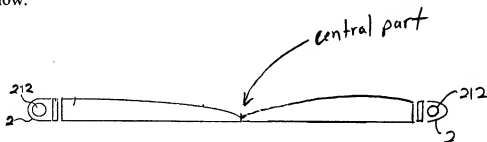
light guide member 30, the light from the light source 1 exits the light guide member through both of the opposite surfaces (i.e., the curved slope 131 and the flat side opposite the slope), towards the reflection plate 4 on the flat side and also towards the observer on the sloped side. Light reflecting from the reflecting plate 4 re-enters the light guide member 30 and exits through the slope 131 of the light guide member. (“The light beam outputted for illumination from the light guide member 30 illuminates the reflecting plate 4, and turns back as reflected light. The reflected light comes incident again on the light guide member 30 from its bottom surface, and is outputted from the top surface of the light of the light guide member 30” (col. 12, lines 38-43¹).

If, as suggested in the Office Action, the two light guide members 203 in Fig. 23C of Nakabayashi were replaced with the light guide member 30 of Fig. 14, the resulting device would have light from the light sources 212 and 211 exiting through the curved slope toward the observer, as taught in Fig. 14 of the reference. Accordingly, the combined embodiments would not include a curved reflecting surface formed so that the light incident from the side end faces are reflected totally on the curved reflecting surface, as called for in claim 20.

Although this is a general description of light propagation through the device shown in Fig. 8, which is in the second embodiment of the invention in Nakabayashi, Figure 14 is described as being an aspect of the second embodiment. See col. 13, lines 4-34.

- B. The Nakabayashi reference also does not disclose or suggest that the thickness of the light guide plate is smaller at both side end faces and becomes greater in a central part thereof.

Figure 14 of Nakabayashi et al. teaches that the thickness of the light guide member 30 becomes smaller away from the light source 1. Thus, if the light guide member 30 of Fig. 14 were combined with the light guide member 203 shown in Fig. 23C of Nakabayashi, the two ends that join would be the portions away from their respective light sources. The place where the two ends join would also be the central part of the combined light guide members. The suggested combination would likely result in an arrangement such as shown below.



As clearly shown in the combined light guide member, the thickness of the central part would be smaller than the ends where the light sources are provided. Therefore, the combination suggested in the Office Action would not include the claimed curved reflecting surface which is formed so that the thickness of the light guide plate is smaller at both end faces and becomes greater in a central part thereof, as required in the claim. The claims are believed to be allowable for this reason also.

II. It Would Not Have Been Obvious to One of Ordinary Skill in the Art to Turn to Nakabayashi et al. to Derive the Present Invention.

- A. Nakabayashi is directed to a reflection type liquid crystal display requiring a reflection plate. The present invention relates to a backlight unit of a transmissive liquid crystal display panel that functions entirely without a reflection plate.

Generally, a reflection type crystal display device includes a light guide member, a light source and a reflecting plate, as shown in Fig. 16 of Nakabayashi. The light guide member includes grooves or other features that reflect light from the top face of the light guide member light source onto the reflecting plate (4 in Fig. 16). Thus, the bottom face of the light guide member (63 in Fig. 16) (opposite the light exit surface or top face) must readily allow light to be passed therethrough, so that the reflecting plate can reflect the light back through the light guide member 63 and out the top face or exit surface to reach the observer (see col. 1, lines 27-44).

In contrast, the present invention is directed to a backlight unit (a light source device 14) of a transmissive liquid crystal display panel, and accordingly, does not require a reflection plate. The light guide plate itself has a curved reflecting surface that is opposite the light exit surface, and is formed so that the light incident on its curved reflecting surface is reflected totally. The reflected light then exits the opposite plane light exit surface without the aid of a separate reflection plate. Therefore, one of ordinary skill in the art working with the transmissive liquid crystal display device which entirely dispenses or omits the use of a reflection plate would not have looked to the teachings of Nakabayashi which expressly

requires the use of a reflection plate. For this reason, it would not have been obvious to one of ordinary skill in the art to have turned to Nakabayashi et al. to derive the present invention.

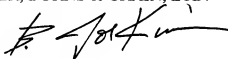
II. CONCLUSION

For all of the above reasons, Applicant respectfully requests that the Board reverse the §103 rejection of claims 20-23, with instructions to allow this application.

Respectfully submitted,

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CLAIMS APPENDIX

The following claims (claims 20-23) are involved in this appeal:

20. A liquid crystal display device comprising:

a liquid crystal display panel;

a driving circuit for supplying a predetermined drive signal to the liquid crystal display panel; and

a light source device for illuminating the liquid crystal display panel from a back side thereof and having first and second light sources and a light guide plate,

wherein the light guide plate has a planar light exit surface provided in the liquid crystal display panel side, a curved reflecting surface that is opposite to the light exit surface and that is formed so that a thickness of the light guide plate is smaller at both side end faces and becomes greater in a central part thereof and a light-scattering element formed on the reflecting surface;

the first light source is provided in neighborhood of the one side end face of the light guide plate; and

the second source is provided in neighborhood of the other side end face of the light guide plate; and

the curved reflecting surface is formed so that a light incident from the one side end face is reflected totally on the curved reflecting surface of a neighborhood of the first

light source and a light incident from the other side end face is reflected totally on the curved reflecting surface of a neighborhood of the second light source.

21. A liquid crystal display device according to claim 20, wherein the light-scattering element has a scattering layer formed by using screen printing.

22. A liquid crystal display device according to claim 20,
wherein the light guide plate has a first lighting element for taking out light guided from the side of the first light source and which includes the light-scattering element and a second lighting element for taking out light guided from the side of the second light source and which includes the light-scattering element;

the first lighting element is provided in an area other than the neighborhood of the first light source and takes out light guided from the side of the first light source with higher efficiency as the distance to the second light source is smaller; and

the second lighting element is provided in an area other than the neighborhood of the second light source and takes out light guided from the side of the second light source with higher efficiency as the distance to the first light source is smaller.

23. A liquid crystal display device according to claim 21, wherein the light guide plate has a first lighting element for taking out light guided from the side of the first light source and which includes the light-scattering element and a second lighting element for taking out light guided from the side of the second light source and which includes the light-scattering element;

the first lighting element is provided in an area other than the neighborhood of the first light source and takes out light guided from the side of the first light source with higher efficiency as the distance to the second light source is smaller; and

the second lighting element is provided in an area other than the neighborhood of the second light source and takes out light guided from the side of the second light source with higher efficiency as the distance to the first light source is smaller.

EVIDENCE APPENDIX

No evidence is submitted by Appellants pursuant to 37 C.F.R. §§1.130, 1.131 or 1.132, or entered by the Examiner and relied upon by Appellants in this appeal.

RELATED PROCEEDINGS APPENDIX

There are no related decisions rendered by a court or the Board in any proceeding pursuant to 37 C.F.R. §41.37(c)(1)(ii).